1983

An examination of the factors involved in the mobilization of strategic sealift assets.

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THESIS

AN EXAMINATION OF THE FACTORS INVOLVED IN THE MOBILIZATION OF STRATEGIC SEALIFT ASSETS

by

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June 1983

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) An Examination of the Factors Involved in the Mobilization of Strategic Sealift Assets		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis; June 1983 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Thomas R. Markiewicz		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		12. REPORT DATE June 1983 13. NUMBER OF PAGES 71
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

National Defense Reserve Force (NDRF)
Ready Reserve Force (RRF)
Military Sealift Command (MSC)
Maritime Assets
Merchant Marine

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This study examines the various factors and related problems involved in the mobilization of U.S. strategic sealift assets. Specifically dealt with are the National Defense Reserve Fleet (NDRF), the Ready Reserve Force (RRF), and the Military Sealift Command (MSC). How World War II led to their inception, their roles during the Korean and Vietnam conflicts, and difficulties encountered are included, as well as a financial analysis of

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE
S/N 0102-LF-014-6601

#20 - ABSTRACT - (CONTINUED)

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An Examination of the Factors Involved in the Mobilization of Strategic Sealift Assets

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MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL

June 1983

ABSTRACT

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I. INTRODUCTION

A. PURPOSE

The purpose of this study is to examine the ability of U.S. maritime reserve assets to effectively respond when needed. Why and how these forces were first established, how they have performed in the recent past, the physical condition of their assets, and an analysis of what this author believes to be their current problem areas will be discussed.

In the event of a national crisis with the U.S. government being faced with the repositioning of a large amount of men and supplies to some far corner of the world, the U.S. will rely heavily on maritime assets to move the bulk of these war materials. In addition to active naval assets available, the Military Sealift Command (MSC), the Merchant Marine Fleet, the National Defense Reserve Fleet (NDRF), and the Ready Reserve Force (RRF) will be called upon to provide maritime assets in as short a response time as possible.

Many factors must be considered in the activation of these assets. These factors include: (1) the material condition of reserve units, (2) how much time is involved to bring reserve assets to an operational state, (3) where the manpower assets will come from to man these reserve units, and (4) what cost is involved to reactivate and maintain these assets.

This paper will explore these various factors and single out, as a result of this research and past experience, potential problem areas and, finally, provide some recommendations and viable alternatives to effectively mobilize reserve assets.

B. PROBLEM

The situation regarding the current status of commercial maritime assets in the United States can best be described in the words of Mr. R.E. Casey, President, American Merchant Marine Institute, Inc.:

> While our oceanborne foreign trade expands, the U.S. Merchant Marine contracts. Our active fleet is too small and too old to effectively serve U.S. economic interests, quite aside from the national defense aspects. Once again we are ignoring the tragic consequences of World Wars I and II which saw America faced with a life and death struggle for survival without an adequate merchant fleet even to service its military forces overseas. [Ref. 1]

In lieu of its present capabilities, the Merchant Marine is in no position to stand alone and provide the necessary ships to support a large scale supply line to some foreign shore, and still provide commercial shipping services. Despite an overall increase in tonnage, the U.S. Merchant Marine is at an all time low in numbers of ships [Ref. 2].

C. STATUS

At the end of fiscal year 1981, the U.S.-flag, privately owned, oceangoing, deep-draft merchant fleet totaled 581 ships of 21.6 million deadweight tons (dwt), with 522 ships

on active status and 59 inactive. The fleet composite averaged 37,110 dwt, an age of 17.5 years, and a speed of about 18 knots [Ref. 2].

The active oceangoing fleet, totaling 18.4 million dwt includes: 97 feighters, 249 tankers, 14 bulk carriers, 139 intermodal vessels (containerships, barge-carrying vessels, and Roll On/Roll Off vanships), 5 combination passenger-cargo ships, 11 integrated tug-barge vessels, and 7 Liquified Natural Gas (LNG) tankers.

Of the 59 vessels in inactive status, 33 were temporarily inactive, either awaiting cargoes or undergoing repairs and 26 were laid up [Ref. 2].

In world fleet rankings as of January 1, 1981, the privately owned U.S. fleet placed eighth on a dwt basis and eleventh on the basis of number of ships (see Table I).

The U.S. Merchant fleet has steadily decreased from as many as 2,929 ships in 1960 to only 864 ships as of January 1, 1981. This 70 percent decrease is further amplified by a 44 percent increase in numbers of merchant ships worldwide. This declining trend in U.S. merchant ships is illustrated in Table II.

D. PLAN

To provide some maritime assets, the U.S. government, acting through the Maritime Administration (MARAD), Department of Commerce (DOC), Department of Defense (DOD), and monitored by the Federal Emergency Management Agency (FEMA),

TABLE I

MAJOR OCEANGOING MERCHANT FLEETS OF THE WORLD--JANUARY 1981
(over 1,000 Gross Ton)

Country	No. of Ships	Rank	Deadweight Tons	Rank	% DWT
Liberia	2,271	4	153,342	1	23.4
Greece	2,928	1	69,559	2	10.6
Japan	1,762	5	62,001	3	9.5
United Kingdom	1,056	6	42,302	4	6.5
Norway	616	10	38,575	5	5.9
Panama	2,437	3	38,011	6	5.8
USSR	2,530	2	21,757	7	3.3
US (Privately owned)	578	11	21,103	8	3.2
France	345	18	19,539	9	3.0
Italy	622	8	17,269	10	2.6
Spain	509	12	12,235	11	1.9
Germany	473	13	11,863	12	1.8
Singapore	622	9	11,754	13	1.8
China	695	7	10,129	14	1.5
India	370	17	9,221	15	1.4
All Others	7,053		116,249		17.8
	24,867		654,909		100.0

Source: MARAD 81, The Annual Report of the Maritime Administration for Fiscal Year 1981, October, 1982.

TABLE II

U.S. PRIVATE AND GOVERNMENT OWNED OCEANGOING MERCHANT SHIPS
(over 1,000 Gross Ton)

Year	No. of U.S. Ships	World Ship Total
1960	2,926	17,317
1962	2,733	17,861
1964	2,529	18,115
1966	2,278	18,423
1968	2,071	19,361
1970	1,579	19,980
1972	1,150	21,009
1974	922	24,449
1975	857	22,872
1976	842	25,586
1977	840	24,096
1978	879	24,512
1979	869	24,798
1980	864	24,867

Source: U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, Years 1962 to 1983.

would call upon the Military Sealift Command (MSC), the National Defense Reserve Fleet (NDRF) and the Ready Reserve Force (RRF), to augment current forces.

The Joint Chiefs of Staff and the Secretary of Defense, looking out for military needs, must set priorities, make allocations of military assets, and pass on to the National Shipping Authority (NSA) requirements not filled by DOD vessels. NSA is a select group of experienced shipping industry personnel empowered by MARAD to make actual vessel assignments to the various agencies competing for reserve shipping assets. The first group of ships to be considered are those of the MSC. Currently consisting of 142 ships, MSC is the initial source of sealift capability in an emergency [Ref. 4]. These ships are constantly utilized in peacetime and would form the core of a much larger fleet required in wartime. Should the MSC fleet be considered inadequate the government would then turn to the hiring of commercial vessels through standard charter procedures.

The next group of ships to be called upon would come from the NDRF. As of September 30, 1981, the NDRF consisted of 317 ships [Ref. 2]. However, the initial requisition would come from the RRF. Established in 1977, this program was implemented to provide a sealift capability of approximately 30 ships representing 340,000 measurement tons (mts) by Fiscal Year 1981. During Fiscal Year 1981, the actual RRF was increased from 24 to 27 ships with a sealift capacity

exceeding 427,000 mts [Ref. 2]. These ships, theoretically, could be activated within 5 to 10 days. This time frame is far shorter than the 21 to 45 day window given for the regular NDRF [Ref. 5].

This study will examine each of these maritime sources for providing ships to the government in an emergency. Beginning with the NDRF, the RRF, and ending with the MSC, a brief evolution of each source will be presented along with their present capabilities. In addition, available cost data and an analysis of each of their perceived problems and shortcomings will be presented.

II. NATIONAL DEFENSE RESERVE FLEET

A. BACKGROUND

The Maritime Administration (MARAD) was created as an agency within the Department of Commerce in 1950 and was tasked with, among other things, the responsibility for the preservation and maintenance of the National Defense Reserve Fleet (NDRF). As a result of the signing of Public Law 97-31, on August 6, 1981, MARAD was transferred to the Department of Transportation [Ref. 2].

With close cooperation of the U.S. Navy and other government agencies, a primary responsibility of MARAD is enhancing the ability of the U.S. Merchant Marine to provide logistical support to the military services during a national emergency. In this regard, the agency maintains the NDRF as a ready source of vessels. These vessels are available for use in both military and non-military emergencies, such as a commercial shipping crisis [Ref. 2].

The NDRF was created as an offshoot of the Merchant Ship Sales Act of 1946. This act was established at the end of World War II to dispose of some 5,000 odd vessels created as a result of the war. It soon became apparent to the government that a majority of these surplus ships would remain unsold and, consequently, unused. Because of this problem the NDRF was created. These ships would remain idle but available for service when needed and were moored at nine

different sheltered anchorages located throughout the United States. The locations on the Atlantic Coast were: Hudson River, New York; James River, Virginia; Baltimore, Maryland and Wilmington, Delaware. The Pacific Coast locations were: Suisun Bay, California; Astoria, Oregon and Olympia, Washington. The Gulf Coast locations were at Beaumont, Texas and Mobile, Alabama.

Specifically, the act states:

> The Commission shall place in a National Defense Reserve (1) such vessels owned by it as, after consulting with the Secretary of War and the Secretary of the Navy, it deems should be retained for national defense, and (2) all vessels owned by it on December 31, 1947, for the sale of which a contract has not been made by that time...a vessel placed in such reserve shall in no case be used for commercial operations, except that any such vessel may be used during any period in which vessels may be requisitioned under Section 902 of the Merchant Marine Act of 1936, as amended. [Ref. 6]

At the beginning of the Fiscal Year 1945 there were 1,421 NDRF ships dispersed at these nine locations. By 1950 this total peaked at 2,277 ships. However, by 1978 the NDRF had shrunk to 308 ships. Currently there are 317 ships in the NDRF. Table III is a breakdown of the total number of NDRF ships by Fiscal Year.

As of September 30, 1981, there were 317 ships in the NDRF located at three locations, one on each coast. These locations were: James River, Virginia, on the east coast; Suisun Bay, California, on the west coast and Beaumont, Texas, on the Gulf Coast. Table IV breaks down the current number of ships moored at these three locations and their current status [Ref. 2].

TABLE III

NATIONAL DEFENSE RESERVE FLEET--1945 TO 1981

FISCAL YEAR	NO. OF SHIPS	FISCAL YEAR	NO. OF SHIPS
1945	5	1964	1739
1946	1421	1965	1594
1947	1204	1966	1327
1948	1675	1967	1152
1949	1934	1968	1062
1950	2271	1969	1017
1951	1767	1970	1027
1952	1853	1971	860
1953	1932	1972	673
1954	2067	1973	541
1955	2068	1974	487
1956	2061	1975	419
1957	1889	1976	348
1958	2074	1977	333
1959	2060	1978	306
1960	2000	1979	317
1961	1923	1980	320
1962	1862	1981	317
1963	1819		

Source: MARAD 81, The Annual Report of the Maritime Administration for Fiscal Year 1981, October, 1982

TABLE IV

NATIONAL DEFENSE RESERVE FLEET
SEPTEMBER 30, 1981

NDRF LOCATIONS	RETENTION	SCRAP CANDIDATES	SPECIAL PROGRAMS	TOTALS
James River, Va.	107	19	41	167
Beaumont, Texas	46	1	5	52
Suisun Bay, Ca.	82	5	11	98
TOTAL:	235	25	57	317

Source: MARAD 81, The Annual Report of the Maritime Administration for Fiscal Year 1981, October, 1982

During Fiscal Year 1981, 23 ships were added to the fleet and 31 withdrawn. In the Retention category are those ships maintained for emergency activation under the fleet preservation program. There are currently 237 ships in the program [Ref. 2].

In 1951 authorization for the sale of NDRF ships to operators for commercial trade purposes expired. Thereafter, NDRF ships could only be sold for scrap, for non-transportation purposes or broken out only in time of national crises [Ref. 7].

During Fiscal Year 1981, MARAD sold for scrapping or non-transportation uses 12 Government-owned vessels, with a total return to the government of $2,653,635. From 1958

through 1981, a total of 2,307 vessels were sold for such purposes, with an aggregate return of $201,300,000.

In October 1980, two obsolete vessels were sold for $651,000 for conversion and operation in the fisheries or domestic commerce of the United States, as authorized by Public Law 96-260 [Ref. 2].

Only 147 ships are of the general cargo variety [Ref. 8]. Victory-class ships account for 130 of the general cargo ships. These World War II freighters are driven by steam turbine power plants which enable them to maintain speeds between 15 and 17 knots. With a lift capacity of approximately 10,800 dwt and permanently installed cargo handling equipment, each ship has the flexibility to provide sealift to almost every overseas destination [Ref. 9]. Figure 2.1 lists the principal characteristics of the Victory-class ships.

The remaining ships in the general cargo category consist of 11 Seatrains, 1 container carrier (P-6-SE-PSI), and 5 Mormacpride-class ships (C-3-S-33A) [Ref. 10].

The principal characteristics of the Seatrain ships are listed in Figure 2.2. The Mormacpride-class ships, a relatively new addition to the NDRF, were built in the early 1960's and possess the characteristics of being bigger, faster and more suited to current-day sealift requirements. Figure 2.3 lists the principal characteristics of this class ship.

Length, overall	455'-3"
Length between perpendiculars	436'-6"
Beam, molded	62'-0"
Depth, molded to main deck	38'-0"
Draft maximum for scantlings and at Subdivision	28'-6"
Fuel Oil Capacity, double bottom tanks	1235.8 Tons
Fuel Oil Capacity, deep tanks	1518.6 Tons
Fuel Oil Capacity, settling tanks	128.2 Tons
Total Fuel Oil, tanks 98% full	2882.6 Tons
Total dry cargo (Grain)	523,740 C.F.
Total dry cargo (Bale)	453,210 C.F.
Total Fresh Water	294.9 Tons
Booms, Fourteen	5 Tons
Booms, One	30 Tons
Booms, One	50 Tons
Crew	58
Passenger Accommodations	None
Propelling Machinery	High Pressure Steam Turbine Double Red. Gear
Normal. S.H.P.	8500
Service Speed	16.5

Source: U.S. Department of Commerce, Ready Reserve Fleet Plan, Maritime Administration, December 1977

Figure 2.1 Victory Class--Principal Characteristics

Length, Overall	559'-11"
Breadth (Molded)	68'-0"
Depth (Molded to Main Deck)	39'-3"
Height (Keel to Span Deck)	62'-3"
Maximum Draft Loaded	27'-0"
Light Ship (Including Ballast)	10,663
D.W. Tonnage (At Deep Draft)	10,337
Displacement Tonnage	21,000
Fuel Capacity (BBLS.)	16,500
Shaft H.P.	10,000
Speed (Knots)	16.5

Source: U.S. Department of Commerce, Ready Reserve Fleet Plan, Maritime Administration, December 1977

Figure 2.2 Seatrain--Principal Characteristics

Length, Overall	483'-3"
Length, Waterline	464'-0"
Length between Perpendiculars	458'-0"
Breadth Molded	68'-0"
Depth to Main Deck Side	41'-6"
Draft Mean, Full Load	28'-6"
Draft, Scantling	31'-9"
Displacement, Light Ship	5,920
Fuel Oil, Tons	2,082
Fresh Water, Tons	127
Stores, Tons	40
Personnel and Effect, Tons	8
Misc. Deadweight, Tons	57
Dry Cargo, Tons	4,937
Refrigerated Cargo, Tons	399
Cargo Oil, Tons	2,830
Cargo Deadweight	8,166
Total Deadweight	10,480
Displacement, Full Load	16,400
Cargo Volume, Bale	544,872
Cargo Volume, Grain	604,377
Cargo Volume, Refrigerated	33,900
Cargo Volume, Oil	113,198
Passenger Accommodations	12
Crew Accommodations	55
Propelling Mach	High Pressure Steam Turbine Double Red. Gearing
Shaft Horsepower, Normal	11,000
Service Speed-Knots	18
Booms	5-ton, 10-ton and 1-60/75 ton

Source: U.S. Department of Commerce, Ready Reserve Fleet Plan, Maritime Administration, December 1977

Figure 2.3 Mormacpride Class--Principal Characteristics

The remaining ships are naval auxiliaries and non-retention candidates. The naval auxiliaries consist of mine-sweepers, tugs and other types not appropriate for the transportation of military cargo. The non-retention group consists of special program ships (i.e., the fish reef program, military assistance programs, ships being held for spare parts support, and ships being held for scrap) [Ref. 9].

B. FINANCIAL ANALYSIS

NDRF ships have been utilized for national defense purposes twice since the end of World War II. These ships were called upon for service during Korean hostilities and in support of military operations in Vietnam.

1. Korea

From mid-March through December, 1951, the National Shipping Authority (NSA) authorized the withdrawal of 443 ships from the NDRF to facilitate the return of U.S. lines ships from military support roles to their peacetime trade routes. Because of their limited service and brief layup period since the end of World War II, these ships were able to be reactivated in a relatively short period of time at an average cost of only $135,000 per ship. By the second quarter of 1952, the number of reserve ships in service decreased rapidly to 183. As the demand for additional shipping subsided, these ships were returned to the NDRF sites at an average layup cost of $19,000 per ship [Ref. 11].

	No. of Ships	Cost Per Ship	Total
Activation Cost	443	$135,000	$59,805,000
Layup Cost	443	19,000	8,417,000
	Totals:	$154,000	$68,222,000

The private operators were responsible for overseeing repairs, providing a crew, and general provisioning. The government paid for the break-out costs and activation costs in addition to the private operators' expenses and fees.

During Korean hostilities the break-out of NDRF ships required little preparation since these ships were still fairly new. Consequently, break-out times were excellent, averaging slightly more than three ships every two days. Only a slight amount of repair was necessary during the reactivation process; in general, the hull, machinery, deck gear, and spare parts onboard each reserve ship were adequate for the task at hand. Replacement parts, if not available within the reserve fleet itself, were still available from the original suppliers [Ref. 9].

The average ship age of less than ten years was a significant factor contributing to the overall costs and speed in which these 443 reserve ships could be brought up to an operational condition in support of the Korean conflict. However, as the next section will demonstrate, Vietnam was an entirely different situation.

2. Vietnam

During the three primary buildup years of the Vietnamese conflict, 1965-1968, 172 NDRF ships transported in excess of 6,800,000 tons or 28 percent of military cargo shipped to Southeast Asia [Ref. 12]. By 1970 a total of 173 NDRF ships moved more than 30 percent of all cargo to Southeast Asia.

In July of 1965, 1,594 ships were in the NDRF but only 960 were under preservation [Ref. 13]. These ships were maintained under a program of contact preservation where various preservation coatings are applied to the interior and exterior of the ships. This preservation method along with a general neglect since their use in Korea accounted for most of the problems during the initial activation phase. Consequently, the average activation time for the first 14 ships withdrawn from the NDRF was 21 days which was accomplished on an around-the-clock basis. The average activation time for the next 37 ships was considerably greater at 42 days. This increase in activation time was mainly attributed to: (1) the generally degraded condition of the ships, (2) a greater amount of repair work required and (3) a lack of repair yard capacity creating backlogs. Table V reflects the average days in the shipyard to activate the first 101 NDRF ships in 1965.

Thus, it can be readily seen from Table V that the average days to activate the first 101 NDRF ships was 47.5

TABLE V

Activation Periods of First 101 NDRF Ships--1965

No. of Ships in Group	Average Days in Shipyard
14	21
8	41
28	43
1	31
25	53
6	67
6	64
6	64
7	64
Total: 101	47.5

Source: U.S. Department of Commerce, Ready Reserve Fleet Plan, Maritime Administration, December 1977

days per ship. More significant is the trend of the average which is more than two months per ship for the last 25 ships. Compared to the reactivation time for the Korean hostilities, this was indeed a significant change and was considerably longer than initially envisioned.

The average shipyard costs to reactivate, maintain and repair, and deactivate NDRF vessels during Vietnam were as follows:

	No. of Ships	Cost Per Ship	Total
Reactivation Cost	161	$476,937	$76,786,857
Maintenance & Repair	173	490,984	84,940,232
Deactivation Cost	123	45,392	5,583,216
	Totals:	$1,013,313	$167,310,305

Thus, the average total cost to the government to break-out and reactivate a NDRF ship for the Vietnam conflict was $1,013,313 per ship, which was considerably more than the $154,000 per ship for Korea. Each ship that was broken-out for service cost the government approximately $491,000 through April, 1966. Although this amount seems quite acceptable today, in 1966 it was a source of considerable concern to both MARAD and DOD [Ref. 15]. These figures have not been adjusted for inflation over those 15 years but price changes were moderate during this period with the increase of the GNP deflator from 1950 to 1965 being only 39 percent.

Although the NDRF performed satisfactorily during the Vietnam conflict, the material condition and general responsiveness of the fleet was far below the standards that prevailed during the Korean conflict. This was to be expected, if for no other reason than that the ships had aged during the interwar period [Ref. 16].

C. PROBLEMS/SHORTFALLS

In addition to the initial costs to bring NDRF ships into service other problems were encountered. Among the most significant were:

1. The Acute Shortages of Seagoing Manpower

During Korean hostilities the number of seamen jobs increased dramatically from 57,000 in June, 1950 to 87,000 in June, 1951, an increase of 53 percent in one year [Ref.

7]. High wages and plentiful job opportunities ashore coupled with the uncertain future of a long career at sea contributed to the large number of unfilled seagoing billets. This shortage of skilled seamen in all ratings, in both crew and officers seriously delayed many sailings. As a result the reactivation process was hampered by these shortages in skilled seamen [Ref. 11].

Essentially, the same problem existed when reactivating ships for the Vietnam conflict as existed for the Korean hostilities. The large increase in demand for seagoing manpower far exceeded readily available assets. In spite of massive recruiting campaigns sponsored by both MARAD and MSC, this manpower shortage significantly contributed to sailing delays of NDRF ships [Ref. 11]. Although unsubstantiated, the fact that the Vietnam operation was a highly unpopular issue certainly must have also contributed to the recruiting problems experienced in 1966 through 1968. Table VI illustrates the delayed sailing days for those years.

In addition to delays in sailing times, many ships had to sail shorthanded. This problem is illustrated in Table VII.

Based on operating costs of from $2,700 to $3,500 per day, it is estimated that $7,089,400 additional costs were incurred due to these sailing delays. See Table VIII [Ref. 7].

TABLE VI

Ship Sailings Delayed in Vietnam Due to Crew Shortages

Year	Sailings	No. Sailings Delayed	% Sailings Delayed	Days Delayed
1966	323	160	50	548
1967	563	245	44	833
1968	519	187	36	829
Total:	1,405	592	42	2,210

Source: CNO Report, Sealift Requirements Study, Third Progress Report, December, 1967

TABLE VII

Shorthanded Complements for 1966 and 1967

DATE	TOTAL SAILINGS	SHORTHANDED COMPLEMENTS				
		LICENSED OFFICERS		UNLICENSED--SKILLED		
		DECK	ENG.	DECK	ENG.	STWD
Jan-Dec 1966	323	226	346	29	48	6
Jan-June 1967	286	141	211	24	47	8
Total	609	*367	*557	*53	*95	*14

*Total of Shorthanded billets

Source: CNO Report, Sealift Requirements Study, Third Progress Report, December, 1967

TABLE VIII

Additional Costs Due to Crew Shortages--1966 to 1968

YEAR	SAILINGS	DELAYED SAILINGS	DELAYED DAYS	ESTIMATED ADDITIONAL COSTS*
1966	323	160	548	$1,479,600
1967	563	245	833	2,708,300
1968	519	187	829	2,901,500
TOTAL	1,405	592	2,210	$7,089,400

*Based on operating costs of from $2,700 to $3,500 per day exclusive of fuel costs.

Source: International Maritime Associates Inc., National Defense Reserve Fleet Response Plan, 1976

Another contributing factor to these shortages is the age of these ships. The technology is old and the seamen who can operate this technology are no longer available as a result of attrition or that they are most likely geinfully employed in other endeavors.

2. Shipyard Availability/Capability

During the Korean and Vietnam conflicts, the shipyard capabilities were sufficient to meet the necessary demands. However, in recent years the size of our merchant fleet has been shrinking, so it follows that the number of shipyards required to support them has decreased also. And unless replaced by newer vessels, the older these ships get, the length of time spent in shipyards undergoing

reactivation repairs/maintenance increases. Consequently, if it again becomes necessary to activate a large number of NDRF ships, it is anticipated that to do so will require more time than in the past.

In order to activate a Victory ship from the NDRF in 1977 it was projected that it would take thirty to forty days. DOD concluded that this time frame was unsatisfactory and deemed that a five to ten day break-out period for thirty Victory ships was necessary [Ref. 11].

It becomes apparent that in order to shorten NDRF break-out times the NDRF must be better maintained or that older ships be systematically replaced with newer more operational vessels, or create a RRF.

3. Material Condition of Reserve Ships

As can be surmised from its history, the consideration which is the most fundamental to activation of the NDRF is the material condition of the ships. Upon this condition depend two closely associated areas of concern, cost and turn-around time, each of which could prove prohibitive to future reserve fleet utilization. Despite the fact that the majority of the ships in the NDRF have reached an unprecedented age, due to their limited active service life and major upgrading during Southeast Asian operations, they are considered by many officials to represent a significant future service capability. However, how long these ships can be maintained under the present reserve fleet preservation program in a state conducive to reactivation is an

unknown factor. Excluding the nine ships dedicated to the RRF, there are now 137 ships whose material condition is a source of keen DOD and Congressional interest [Ref. 8].

Prior to 1970, ships designated for retention were preserved using the contact preservation method. This process consisted of coating vital machinery and exposed metal surfaces with special oil, grease, and contact materials designed to arrest corrosion. However, it was discovered during the Vietnam reactivation efforts that these coatings slowly hardened and proved very costly and time-consuming to remove [Ref. 11].

4. Casualties and Ship Reliability

During the initial operating period of approximately one year, about 70 percent of the 51 ships activated in 1965 suffered casualties resulting in lost time averaging 10 days per ship [Ref. 7]. However, over the long run, the majority of the reactivated ships performed in an adequate manner. Based on the operating statistics of 68 ships in service from 17 July 1965 to 1 February 1966, out-of-service time amounted to 4.75 percent as compared to about 3.5 percent under normal operations. Boilers accounted for about one third of all casualties. Other frequent breakdowns were caused by:

1. Condensers
2. Electrical Systems
3. Fresh Water Evaporators

4. Pumps
5. Main Engines
6. Refrigeration
7. Piping
8. Electronic System [Ref. 11]

D. PRESENT CAPABILITIES

In 1977, the trade-in of five C-3 break-bulk ships constructed in 1960-71 provided a more modern basis for the NDRF. Additionally, the Seatrain series of ships already in the NDRF, which are self-sustaining, presented to military planners a better alternative and a more efficient method of carrying vehicles and helicopters. Finally, the addition in 1978 of three Mariner Class vessels constructed in the 1950s further offered newer, faster, and more modern ships. See Figure 2.4 for a list of Mariner Class characteristics.

Although special attention has recently been given to the RRF ships it has not degraded the remaining ships in the NDRF. Even though the Victory Class ships are not utilized as much in the RRF as first planned, they still constitute the largest, 130 out of 218, group of ships in the NDRF retention list for defense purposes [Ref. 19].

According to the Department of Commerce the ships of the NDRF are deemed to be in good condition and properly maintained. This is primarily due to the dehumidification system which has virtually eliminated interior corrosion and deterioration caused by moisture. Specialized equipment is

Length Overall	563'-73/4"
Length between perpendiculars	528'-0"
Beam, Molded	76'-0"
Depth to Main Deck, at side	44'-6"
Depth to 2nd Deck, molded at side	35'-6"
Bulkhead Deck	2nd. Deck
Machinery	Turbine
Designed Sea Speed	20 Knots
Shaft Horsepower, Normal	17,500
Shaft Horsepower, Maximum	19,250
Full Load Draft, molded	29'-9"
Full Load Displacement	21,093 Tons
Light Ship Displacement	7,675 Tons
Passengers	12
Crew	58
Grain Cubic	837,305 Cu. Ft.
Bale Cubic	736,723 Cu. ft.
Reefer Cubic	30,254 Cu. ft.
Fuel Oil (double bottom & settling tanks)	2,652 Tons
Fuel Oil (Deep Tanks)	1,156 Tons
Fuel Oil, Total	3,808 Tons
Fresh Water	257 Tons
No. of Holds	7
Gross Tonnage	9,215
Net Tonnage	5,367

Source: Military Sea Transportation Service Supplement, Loading A Mariner-Class Ship, Bureau of Personnel, 1962

Figure 2.4 Mariner Class--Principal Characteristics

installed to lower the relative humidity and maintain it within the 35 to 45 percent range. Within this dry atmosphere, corrosion and deterioration of equipment is severely retarded. In addition, the ship hulls are protected by an electrocathodic protection system to minimize underwater hull deterioration through corrosion or electrolytic action. The underwater portion of each retention ship is protected by a unitized cathodic grid through which an electric current is applied. The electricity passing through the water to the steel hull renders it inert and highly resistant to oxidation.

However, this is not to say that all 137 retention ships in the NDRF are in a high state of repair or preservation, for such is definitely not the case. It only means that the preservation program utilized is effective in maintaining the superstructure, hull and interior of a Victory or Seatrain Class ship in the same condition as when delivered for layup [Ref. 16].

In addition, the results of inspection reports conducted on the material condition of the ships of the James River fleet indicated that there were numerous secondary areas open to question:

1. Most if not all deck electrical wiring would need to be replaced.
2. Shipboard systems which were disconnected have not been tested in at least eight years.

3. Additional problems were sited in galleys, messrooms, crew quarters, electronic equipment, lifeboats, cargo handling gear, generators, reefers, flaking paint, and deck deterioration. [Ref. 20]

The report also noted for future planning purposes that the majority of these ships would cost between $1.8 and 2.0 million and require from 60 to 70 days in a repair yard, per ship, for reactivation for an emergency use [Ref. 20].

The deterioration in the reserve fleet's material condition has also been hastened by a pronounced lack of budgetary emphasis by MARAD. The reserve fleet allocations over the past eight years have been consistently less than one percent of the total MARAD budget. With the increasing age of the Victory Class ships and increasing maintenance costs, holding reserve fleet funding constant has had an adverse effect on the material condition of the NDRF.

Although the NDRF is maintained in a relatively high state of readiness and preservation, a certain amount of shipyard work would have to be accomplished if the ships were required for service. However, of the shipbuilding industry's 250 firms that repair ships, only 65 are capable of drydocking ships 300 feet or longer. For ships of this size, the repair industry has a total of 128 drydocking facilities; 73 floating drydocks, 50 graving drydocks, and 5 marine railways [Ref. 21].

A competent shipyard workforce is another major concern to meet future national defense requirements in activating

NDRF ships. The Shipbuilders Council of America has predicted a steady decline in numbers of shipyard workers. This decline can be attributed to various factors such as an aging workforce with much of it dating back to World War II and the Korean conflict, and therefore eligible for retirement en masse. Additionally, the council's forecast for revenues reflects a general decline in merchant and naval shipbuilding with a slight increase in ship repair volume [Ref. 22].

E. SUMMARY

The creation of the NDRF after World War II was a logical decision to make because of the large quantity of ships which were in disuse immediately after the war. Considering the lessons learned from the World War II experience, the United States did not want to find itself again in a similar situation to move large quantities of war materials but no way to effectively do it. Consequently, the NDRF became a reality. Because the Korean situation occurred so soon after the conclusion of World War II, the NDRF ships were easily reactivated since the ships were available, the shipyards were available, the manpower was still available, and, as a result, the reactivation costs were relatively cheap. But as the Vietnam build up got underway fifteen years after the Korean conflict ended, the situation had just about reversed itself.

An obvious solution would be to have a manned merchant fleet, in reserve, always ready to mobilize when needed. This of course would be exceedingly uneconomical. The alternatives are to continuously upgrade the NDRF by constantly cycling through newer and more technologically advanced ships that are capable of handling military cargo requirements and are self-sustaining. But the manpower problem still remains as a significant factor. Another alternative would be to create an operational but readily accessible fleet of ships such as in the Military Sealift Command (MSC), where ships are currently manned and operational but under the control of the Navy and be readily available when required.

The MSC and the use of current merchant marine assets will be the subject of further analysis in later chapters. The Ready Reserve Force (RRF) was created in an effort to address some of the problems noted with the NDRF and will be discussed in the following chapter.

III. READY RESERVE FLEET

A. BACKGROUND

Current DOD planning requires supplementary shipping be ready within the first two weeks of a commitment of U.S. forces. In response, the Maritime Administration and the Navy have established a Ready Reserve Force (RRF) within the NDRF. Under this program ships are upgraded and maintained in a state of readiness so as to provide a dedicated fleet which can be placed in service within ten days.

The events which led to the establishment of the RRF began in early 1976 when MARAD, in its role as reserve fleet administrator, conducted an analysis of the time required to break out ships from reserve status. The result of MARAD's examination indicated that activation of reserve shipping could not be accomplished in the DOD-specified five to ten day period. The MARAD activation estimate was from thirty to forty days [Refs. 9,11].

The reasons for this degraded response capability were excessive age, ships maintained in the same degraded material condition as when deactivated, lack of NDRF repair and overhaul equipment, and limited availability of private repair and drydocking facilities. These findings were further corroborated by an independent GAO report, dated 6 October 1976, which reported the results of a review of the capability of the U.S. fleet to meet contingency requirements [Ref. 23].

These MARAD evaluations and GAO report results are what led up to the initial 30 reserve, Victory Class ship requirement. This upgrading of a portion of the NDRF ships was to be conducted by a MARAD-proposed four-phase program which was estimated to cost $1.5 million per ship.

An agreement between the Department of Commerce and the Navy resulted only after the Navy stipulated: that the specific ship mix and type, total number of ships, and future changes in the composition of the RRF be at the Chief of Naval Operations (CNO) discretion, and subject to agreement by the Assistant Secretary of Commerce for Maritime Affairs [Ref. 6].

In an effort to have NDRF ships be more responsive to emergencies, in June 1975 MARAD initiated a 5-year program to provide the U.S. Navy with sufficient shipping to accommodate a sealift capability of approximately 340,000 mts. Selected ships of the NDRF are upgraded to RRF status and can be activated for sealift operations on 5 to 10 days notice; an average of 4 weeks is required to activate other NDRF vessels [Ref. 2].

In November 1976, a Memorandum of Understanding between the Department of Commerce and the Navy provided for the establishment, maintenance, and control of the RRF as part of the NDRF. This memorandum sets forth the conditions under which the specified ships will be held in a ready reserve status until needed by the Department of Defense. The goal of the RRF, a joint MARAD-Navy project, is to

provide a quick-response sealift capability for U.S. military emergencies. Under the current RRF program, MARAD will maintain approximately 30 ships in an advanced state of readiness. The selected ships will meet all of the requirements of the American Bureau of Shipping, and the U.S. Coast Guard requirements for Certificates of Inspection. Funding for upgrading ships for the RRF program is provided by DOD [Refs. 2,5].

In 1979, the RRF consisted of 27 ships with a sealift capacity exceeding 427,000 mts. Table IX presents the 1979 RRF inventory.

B. PRESENT CAPABILITIES

Although the initial plan for the RRF was that it be composed of 30 World War II, Victory Class ships, the program was changed almost immediately. In 1977, the trade-ins of 5, C-3 break-bulk ships constructed in 1960-61, and the addition in 1978, of 3 Mariner Class ships constructed in the 1950's, gave the NDRF, along with the Seatrain series ships, a more modern and faster selection of ships to be maintained in a RRF status. Consequently, MARAD in conjunction with the Navy, altered the objectives of the RRF. Henceforth, a variety of ship types rather than exclusively Victory Class ships would be utilized to accommodate the 340,000 mts requirement as originally planned. As depicted in Table IX, in 1979 the RRF inventory had already consisted of 27 ships. By May 1983 this inventory had increased to

TABLE IX

Ready Reserve Force Ships--1979

TYPE	NAME	LOCATION
CS-S-33a	Pride	James River
C3-S-33a	Bay	James River
C3-S-33a	Cove	James River
C3-S-33a	Scan	James River
C3-S-33a	Lake	James River
VC2-S-AP2	Catawba Victory	James River
C4-S-1P	Lone Star Mariner	James River
C4-S-1H	Old Dominion Mariner	James River
C4-S-1H	Cracker State Mariner	James River
Container Carrier	Washington	Beaumont
*LSD	8 Ships	James River Suisun Bay
AO's	9 Ships	James River Beaumont Suisun Bay

*Potential RRF Candidates

Source: U.S. Department of Commerce, Ships in the National Defense Reserve Fleet--By Design, Maritime Administration, February, 1979

31 ships. Table X presents the most current RRF inventory and their mooring locations.

Periodically and without advance warning, tests are conducted to ensure the military readiness of RRF ships and to provide an assessment of their performance. The operation involves activating an RRF ship, including crewing, storing, fueling, conducting 24-hour sea trials, and then positioning the ship on a military loading berth ready to load--all within the 5 to 10 day DOD requirement.

In 1979, the activation of the SS Washington, was completed in less than 7 days and was kept in active status for three weeks as a backup ship for REFORGER 79, a U.S. military exercise. This four month exercise was designed to test the military strategic mobility system. The SS Maine was designated by the Military Sealift Command as the primary RRF ship to be deployed. In November 1978 the SS Maine was assigned to a general agent, crewed, stored, and outfitted; proceeded to Port Arthur, Texas, and loaded over 11,000 mts of military cargo for Europe. The SS Maine delivered her REFORGER 79 cargo on schedule and was subsequently utilized in the redeployment phase of the exercise returning military equipment to the United States. The opportunity for the Maine to operate with the MSC and the Military Traffic Management Command, together with the "no-notice" activation of the Washington, provided a realistic test of the RRF concept and capabilities [Ref. 5].

TABLE X

Ready Reserve Force Ships--1983

TYPE	NAME	LOCATION
CS-3-33a	Pride	Philadelphia
CS-3-33a	Scan	Philadelphia
CS-3-33a	Lake	Philadelphia
CS-3-38a	Adventurer	James River
C3-S-38a	Agent	James River
C3-S-38a	Aid	James River
C3-S-38a	Ambassador	James River
C3-S-46a	Banner	James River
C4-S-58a	Cape Alava	James River
C4-S-58a	Cape Ann	James River
C4-S-58a	Cape Alexander	James River
C4-S-58a	Cape Archway	James River
C4-S-58a	Cape Avinof	James River
C4-S-1H	Cracker State Mariner	James River
C4-S-1H	Old Dominion Mariner	James River
C4-S-1P	Lone Star Mariner	James River
C5-S-78a	Great Republic	James River
C5-S-78a	Young American	James River
Military Cargo	Ohio	James River
Military Cargo	Puerto Rico	James River
VC2-S-AP2	Catawba Victory	James River
C4-S1-QB	President	Suisun Bay
C4-S1-QB	Lincoln	Suisun Bay
C4-S1-U	California	Oakland
C4-S1-U	Santa Anna	Beaumont
C4-S-57a	Pioneer Commander	Beaumont
C4-S-57a	Pioneer Contractor	Beaumont
C4-S-57a	Pioneer Crusader	Beaumont
Military Cargo	Maine	Beaumont
Military Cargo	Washington	Beaumont
T2-SE-AlJ	Chancellorsville	Beaumont

Source: U.S. Department of Transportation, MARAD, Reserve Fleet Division, (Phone Conversation), Washington, D.C., June 1983

In 1981, three vessels were activated by the CNO and were successfully positioned to receive cargo in less than 10 days [Ref. 2].

C. IMPLEMENTATION

Prior to the actual break-out of ships from the NDRF, several administrative decisions must be made by cognizant activities within the Department of Navy and Commerce to insure activation is warranted. The necessary conditions and procedures for reserve fleet utilization are specified in the following documents:

1. Section 11, Merchant Ship Sales Act of 1946 and Section 902, Merchant Marine Act of 1936.
2. 1954 Memorandum of Agreement between the Department of Commerce and the Department of Defense, often referred to as the Wilson-Weeks Agreement, and
3. 1967 Memorandum of Agreement between MSC and MARAD.

Sections 11 and 902 of the Merchant Ship Sales Act of 1946 and the Merchant MArine Act of 1936, respectively, provide the basic authority to withdraw ships from the NDRF but only under conditions where the threat of government requisitioning of commercial shipping exists. The pertinent passage of Section 11 reads in part:

> A vessel placed in such reserve shall in no case be used for any purpose whatsoever except that any such vessel may be used for account of any agency or department of the United States during any period in which vessels may be requisitioned under Section 902 of the Merchant Marine Act of 1936, as amended. [Ref. 25]

Additionally, Section 902 stipulates the following:

> Whenever the President shall proclaim that the security of the national defense makes it advisable or during a national emergency declared by proclamation of the President, it shall be lawful for the commission to requisition.... [Ref. 25]

Thus, a necessary condition prior to activation of the NDRF is that the threat of requisitioning exists. However, the authority to requisition can only be granted by the President when the national security is threatened or when a state of national emergency is proclaimed.

The Wilson-Weeks Agreement is a long-standing document whose basic purpose is to overcome maritime industry fears of government competition. It has as one of its purposes to prioritize the acquisition of sea assets and services. In addition, while recognizing the MSC controlled fleet, it also sought to protect commercial business. In essence, it dictates that the U.S. government will make full use of merchant fleet assets before calling out the NDRF [Ref. 16].

The principle behind this is that commercial shippers want all the government business they can handle. Since the U.S. maritime industry has a poor competitive position in world trade, it looks to the government for business on a regular basis. Thus, the industry desires to be fully utilized before allowing more ships to be pushed into the pool [Ref. 26].

The government has adhered to policies geared to keep merchant ships busy. A public law passed in 1954, and

still in force today, requires that fifty percent of all government cargo being shipped overseas be transported in U.S. bottoms [Ref. 26].

The basic prerequisites for activation of the NDRF also hold true for the RRF. A separate 1976 Memorandum of Agreement between the Department of Navy and the Department of Commerce, covering the RRF exclusively, sets forth the authority and procedures for activation. Basically, once the decision to employ reserve assets has been reached, the authority to initiate an RRF callup rests with the Commander, Military Sealift Command. Acting as agent for the CNO, he determines the ship mix required and the time frame for RRF deployment. This decision, however, is subject to concurrence by the Assistant Secretary of the Navy--Installations and Logistics, and the Assistant Secretary of Commerce for Maritime Affairs [Ref. 27].

D. SUMMARY

The basic concept of the RRF, to provide a small group of general cargo ships which would be maintained according to their general class type, certified, and ready for immediate callup, is a viable short term solution for reserve maritime asset response. With the continual rotation of more modern ships into the RRF fleet, an effectives operational level of responsiveness can be maintained. As "no-notice" tests have proven, the RRF has effectively responded within the DOD-established response time. This indicates

that when ships are assigned RRF status, they have been properly maintained.

Consequently, it is the opinion of this author, that the program has proven itself to be successful by MARAD's ability, in the last few years, to upgrade and modernize the RRF.

IV. MILITARY SEALIFT COMMAND

A. BACKGROUND

Another source of maritime assets are the ships of the Military Sealift Command (MSC), which was known as the Military Sea Transportation Service (MSTS) prior to 1970.

The MSTS was established in 1949 as the result of the unification of the Army and the Navy Transportation Services. Pursuant to a Secretary of Defense directive dated 2 August 1949, it became an activity within the Department of the Navy. As part of the Navy's operating forces it is responsible, through its commander, to the Chief of Naval Operations [Ref. 28].

The mission of the MSTS; pursuant to the aforementioned directive of the Secretary of Defense, was:

1. Provide under one authority, the control, operation and administration of sea transportation for personnel and cargo of the Department of Defense (excluding that transported by units of the fleet) and as authorized or directed for other government agencies of the United States subject to policies and priorities issued by the Joint Chiefs of Staff.
2. To prepare plans for its employment and expansion in times of national emergency based upon the policies and directives of the Joint Chiefs of Staff and appropriate agencies of the Department of Defense and

to maintain a base organization capable of expansion to implement such plans.

3. To consult with the appropriate agencies of the Department of Defense in coordinating execution of approved emergency plans requiring the services, facilities, and personnel of commercial sea carriers and in negotiating therefor. [Ref. 28]

With the exception of an undisclosed but probably small volume of cargo that is carried in regular Navy ships, all Defense Department cargoes that move by sea do so under arrangements made by the Military Sealift Command, the department's shipping agency. Although this command is a unit of the Navy, and is staffed in part by Navy personnel, its job is to furnish ocean transportation services to the entire Department of Defense and occasionally other government organizations. The command operates a fleet of government-owned vessels, all of which are technically in the custody of the Navy, but only a few of which are commissioned vessels crewed by Navy officers and men. Most of this fleet is manned by civilian crews in the employ of the government. A smaller number of other government-owned ships that have been assigned to the Military Sealift Command are operated for it by private contractors on a cost-plus-fixed-fee basis. Together these ships compose the command's "nucleus fleet" [Ref. 29].

On June 30, 1972, the nucleus fleet consisted of ninety-seven dry cargo ships, transports, and tankers. It was

smaller during the 1950s, but somewhat larger in the early 1960s. It expanded during the Vietnam buildup to a peak of 134 vessels between May 1967 and February 1968 before declining again. Despite its small size in 1972, the nucleus fleet still constituted a sizable fraction of the entire U.S. oceanogoing merchant fleet, which numbered 655 active or temporarily inactive vessels on June 30, 1972. The nucleus fleet also contained thirty-five special project vessels, such as vessels equipped for oceanographic research that were operated by the command for the Naval Oceanographic Office and missile-tracking ships operated for the National Aeronautics and Space Administration [Ref. 29].

The size of the nucleus fleet was limited in 1954 by an agreement between the Secretaries of Defense and Commerce, the so-called Wilson-Weeks agreement. Except under conditions of full mobilization, the nucleus fleet must not contain more than fifty-six transports, thirty-four cargo ships, and sixty-one tankers [Ref. 29].

The same agreement sets forth the order in which the Defense Department may turn to other sources for shipping space. First, it must make as much use as possible of U.S. liner services. If it needs more space, the department may charter U.S. flag vessels from private owners. If still more space is needed, the Maritime Administration may break out vessels from the NDRF and put them in service for the Defense Department. Only after these sources have been exhausted

may the department engage space aboard foreign flag vessels. However, the Defense Department is allowed some flexibility in observing these priorities. A literal interpretation of the agreement would forbid the use of foreign flag shipping as long as one serviceable vessel remained in the reserve fleet. In practice it would often be a reckless waste of money to activate a vessel solely to carry a small quantity of cargo that could conveniently be moved aboard a foreign flag carrier. And so the command has occasionally engaged foreign shipping although at no time since World War II have all the vessels in the reserve fleet been placed in service [Ref. 29].

The substance of the 1954 agreement must be counted among the most valuable favors that the federal government ever conferred on the U.S. shipping industry. By a stroke of the pen the government renounced all intention of operating a fleet of publicly owned vessels that would deprive the privately owned merchant marine of a sizable share of the nation's defense cargoes.

Less than two months after the Wilson-Weeks agreement was concluded, the Cargo Preference Act of 1954 was signed into law. Like the agreement, the Cargo Preference Act had an important effect on the division of military cargoes between privately owned and government-owned U.S. flag vessels. Ships of the nucleus fleet and NDRF were implicitly forbidden to carry more than half of all military cargoes. The agreement and the act neatly complemented one another: the one

imposed a ceiling on the size of the nucleus fleet and enjoined the Defense Department from using ships of the reserve fleet as long as private shipping was available; the other required that at least half of all military cargoes should be transported in privately owned vessels [Ref. 29].

In all but two years during the 1960s, government-owned vessels carried between 20 and 30 percent of all MSC dry cargoes. Their share briefly exceeded 30 percent in fiscal year 1967, when more than 170 reserve vessels were pressed into service to help meet the demand for additional shipping to Vietnam. As these ships were returned to the reserve fleet their place was taken by privately owned vessels, and the share of dry cargoes carried by government-owned vessels fell. In fiscal 1972 government-owned vessels carried less than 10 percent of all MSC dry cargoes. In 1965 nearly half of all U.S. personnel transported to Vietnam traveled by sea, apparently aboard troopships of the MSC [Ref. 29].

Table XI represents the MSC controlled fleet inventory for 1977.

B. PRESENT CAPABILITY

As the single manager agency for DOD sealift requirements, MSC essentially performs the same mission as MSTS:

1. Provide sealift capability for the deployment and support of U.S. forces and material in an emergency.
2. Develop plans for expansion of sealift capability during an emergency or in time of war.

TABLE XI

MSC Controlled Fleet--1977

NUCLEUS	TYPE	YR. BUILT	SPEED	M/T
METEOR	RO/RO	67	20.0	24,279
COMET	RO/RO	58	18.0	17,096
MIRFAK	C-1	57	13.0	2,651
BLAND	C-3	51	18.5	13,222
TOWLE	VC-2	45	16.5	10,446
BROSTROM	C-4 (H/L)	43	17.0	16,985
CHARTERED SHIPS				
CALLAGHAN	RO/RO	67	25.0	50,044
AMER RELIANCE	C-4	65	21.0	15,800
AMER RANGER	C-4	65	21.0	15,450
AMER RACER	C-4	64	21.0	15,800
AMER CHAMPION	C-4	63	21.0	15,400
AMER CHIEFTAIN	C-4	63	21.0	15,400
AMER COURIER	C-4	63	21.0	15,400
AMER CORSAIR	C-4	63	21.0	15,400
PION CONTENDER	C-4	63	21.0	15,400
PION COMMANDER	C-4	63	21.0	15,400
PION CRUSADER	C-4	63	21.0	15,400
PION CONTRACTOR	C-4	63	21.0	15,400
PION MOON	C-4	62	21.0	15,400
AMER CHARGER	C-4	62	21.0	15,400
AMER CHALLENGER	C-4	62	21.0	15,400
TRANSCOLORADO	C-4 (H/L)	45	17.0	16,552
TRANSCOLUMBIA	C-4 (H/L)	45	17.0	16,552
GREEN SPRING	EX C-4 (MOD)	45	17.0	18,874
GREEN WAVE	EX C-4 (MOD)	45	17.0	18,874
GREEN LAKE	EX C-4 (MOD)	44	17.0	18,874
GREEN PORT	EX C-4 (MOD)	44	17.0	18,874
				443,523

Source: Evers, W.B., An Analysis of the Constraints on the Activation of the National Defense Reserve Fleet in a Non-Mobilization Contingency, Master's Thesis, Naval Postgraduate School, September 1978.

3. Provide peacetime logistical support by worldwide sealift of supplies, equipment, and material.
4. Provide, man, and operate ships used for non-transportation purposes such as oceanographic and hydrographic research, support of the space program, and cable laying and repair. [Ref. 6]

With respect to the above mission areas, MSC uses its own ships, buys space on scheduled commercial liners and charters commercial ships to fulfill Defense Department sealift requirements. As of June 3, 1983, MSC controlled a fleet of 142 ships. The nucleus fleet consisted of 86 ships: 14 specialized dry cargo ships, 21 tankers, 29 naval fleet auxiliary ships, 20 scientific support ships, and 2 shallow draft tugs. The command's chartered commercial fleet includes 56 ships of various types. Table XII represents the current active MSC nucleus of active ships and Table XIII represents the current MSC controlled fleet inventory.

TABLE XII

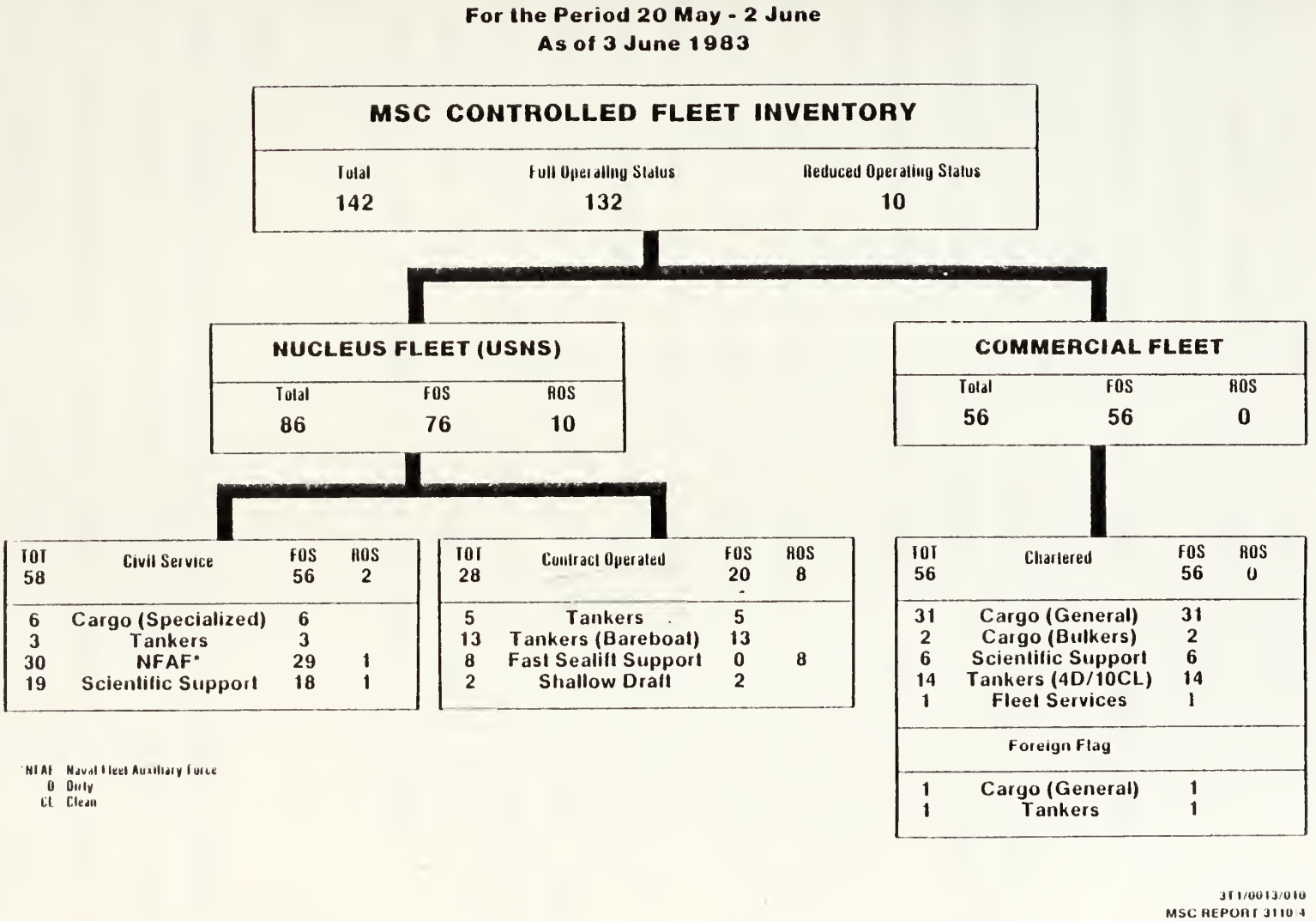
MSC Nucleus of Active Ships--1983

SHIP	TYPE
COMET	RO/RO C-3
JUPITER	RO/RO C-7
MERCURY	RO/RO C-7
METEOR	RO/RO C-4
NORTHERN LIGHT	RO/RO C-3
SOUTHERN CROSS	RO/RO C-3

Source: Military Sealift Command, Background, 1982

TABLE XIII

MSC Controlled Fleet Inventory--1983



Source: Military Sealift Command, Cargo Division, MSC Report 3110-4, Washinton, D.C., June 1983

In fiscal year 1982, MSC delivered 7.3 million measurement tons of dry cargo and 11.1 million long tons of petroleum for the military services. MSC relies heavily on the U.S. Merchant Marine, shipping over 93 percent of all dry cargo on privately owned U.S. flag ships, with 67 percent of all cargo moving on scheduled cargo lines. Approximately 61 percent of all worldwide military dry cargo now moves in containers. In addition, MSC delivered 18 million long tons of petroleum products for the Defense Fuel Supply Center and the Strategic Petroleum Reserve Program [Ref. 30].

Recently the Navy purchased eight large SL-7 containerships from private industry; the fastest ships in the U.S. merchant fleet at 33 knots. Conversion to Roll-On/Roll Off ships for ground force unit lift equipment results in a tremendous enhancement in sealift capability to load or offload in one day the majority of the unit equipment (tanks, artillery, wheeled vehicles, etc.), for two Army mechanized or armoured divisions. Sailing time to Europe is four days or eleven days to the Persian Gulf via the Suez Canal [Ref. 30].

C. SUMMARY

MSC provides the sealift arm of DOD's strategic deployment capability. During wartime the command would be called upon to effect movement of the lion's share of U.S. material and unit equipment when and where U.S. forces are required. In peacetime MSC, as an integral member of the Joint Planning

and Deployment community, plays a key role in the development of joint operations plans for support of unified area commanders worldwide [Ref. 30].

Wars during the last three decades, particularly the conflict between the United Kingdom and Argentina over the Falkland Islands, have vividly demonstrated that sealift capabilities must be expanded in emergencies. MSC is working to maintain a core of readily available ships and trained personnel to help assure its ability to perform its contingency mission should the need arise [Ref. 30].

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

This study has demonstrated that in the past the NDRF, RRF, and the assets assigned to the MSC have lived up to their capabilities when called upon. Both during the Korean conflict and Vietnam conflict, these assets have answered to the call and provided the necessary ships which were paramount in achieving military operational goals. Although these ships performed well and responded quickly for the Korean operation, as time went on and as these reserve ships became older and less than operationally maintained, their reactivation time became longer and more costly.

As the possibility of war always remains a reality the U.S. government must in some fashion anticipate the logistical movement of war materials by sea. The form this task has taken in the past has been through the activation of the reserve fleet. What form it will take in the future is unclear. Although during the Korean and Vietnam conflicts a significant percentage of war material was moved by ship, towards the end of the Vietnam conflict the trend was to move more and more cargo by air.

B. CONSIDERATIONS

Many factors must be considered if a reserve fleet is to remain in existence and be cost effective; these include:

1. Ship Characteristics

Ships must be of such design and have the capability to independently handle all types of military cargo. These ships must be continually upgraded to keep pace with the needs and requirements of the military.

MARAD has appeared to have made progress in rotating out of the reserve fleet older designed cargo ships and replacing them with newer designed ships as the Seatrain Class and Maritime Class ships. These ship classes are larger, newer, faster and more versatile than the aging Victory Class ships which was the initial class.

2. Responsiveness

Having an inventory of reserve ships to draw upon in an emergency has some gratification. However, to be effective and provide utility to the government these reserve ships must be reactivated within the alloted time frame established by the Department of Defense. This reponse time is directly related to how well the ships have been maintained, preserved, and the availability of spare parts. Again MARAD has demonstrated that ships recalled from the RRF were able to be reactivated within the maximum 10 day period furing the "no-notice" tests.

Another contributing factor to the achievement of this end is the availability of dry dock facilities. This has become a serious problem as our shipbuilding industry and maritime fleet continue to shrink in size. The competition

of foreign shipyards is another ingredient that has reduced in number U.S. shipyards that can accommodate larger ships. It can also be assumed that as the U.S. gets more involved in a war, shipyard space will be at a premium and backlogs are sure to result in longer reactivation times. Along with the reduced number of capable shipyards that shipyard workforce is also continuing to decline. This reduction in skilled shipyard workers just prolongs even more reserve ship turnaround time.

3. Cost

As was demonstrated in comparing the costs to reactivate a ship for the Korean hostilities and for the Vietnam conflict, reactivation costs had escalated in excess of 200 percent. A significant contribution to these costs was the type of preservation method employed and the general material condition of the ships. As the older ships are phased out of the reserve inventories so are the older preservation methods. The newer more effective dehumidification methods have been a significant improvement in reducing reactivation costs.

4. Manpower Availability

A continual problem since the Korean conflict is the availability of qualified seamen to man reactivated ships. Manpower availability has paralleled the trend of the maritime industry and becomes even more of a problem as these qualified personnel establish themselves in difference career endeavors.

As Mr. W.B. Evers has ascertained, in comparing optimistic and pessimistic scenarios in the activation of reserve ships, "...during a contingency situation, commercial shipping will have to be withdrawn temporarily for military use until adequate reserve shipping becomes available" [Ref. 16].

Will history repeat itself? Probably not, at least not to the extent that was experienced in World War II, since as early after the war as 1949 the government attempted to foresee this contingency and established the MSC, formerly the MSTS. With the MSC ships currently in operational status, the immediate impact of a mobilization is lessened while the MSC buys time so additional RRF and NDRF assets can become reactivated and operational. Although some commercial units will undoubtedly be called upon, it is not anticipated that they will have the same impact as they had in World War II.

Except for the ships assigned to the RRF the most serious factor is the material condition of the remaining ships in the NDRF. Due to their poor material condition, it is estimated that an average of 40,000 manhours per ship will be required to fully service a reserve ship and make it ready for sea [Ref. 16].

The modernization of the RRF and MSC inventories have been a significant step in the right direction. Only through an ongoing modernization program will the initial reserve assets be conducive to a timely reactivation evolution.

This goal can only be accomplished by MARAD's continual effort to involve congressional support to insure adequate funding to attain these ends.

The continual expansion of MSC's fleet support program is warranted to achieve cost savings and conserve military personnel for combatant ships. The MSC units would be the first to be activated, and their performance would determine the scope of subsequent activation of RRF and NDRF assets. If the gravity of the situation is significant enough to warrant more ships than are available from the MSC and the RRF, the U.S. commercial fleet would have to be called upon.

Because of the trend in our Merchant Marine capabilities a large scale repositioning of war materials would be a serious problem. With ever increasing U.S. commitments throughout the world, a fleet of 578 ships carrying only 5 percent of U.S. commerce would be hard pressed to perform adequately.

In summary, the following conclusions may be drawn from this study:

1. The United States needs a stronger more capable reserve fleet of merchant ships.
2. United States reserve fleet assets must be upgraded and modernized to meet the changing military requirements for war materials and military operations.
3. Regulations and procedures to activate reserve assets must be streamlined to facilitate timely reactivation programs.

4. The U.S. shipbuilding industry must establish itself once again to be a competitive force in the world.
5. Government and congressional support is mandatory if adequate funding is to be made available to provide a strong foundation from which to build better and more effective programs.

C. RECOMMENDATIONS

To reestablish the strength of the United States reserve fleet of merchant vessels into a true, dependable and strong "Fourth Arm of Defense," the following recommendations are suggested:

1. Increase NDRF Funding Levels. This recommendation would insure a more effective preservation and maintenance program. It would also provide necessary funding to augment current repair facilities in order to maintain shipboard equipment in an operational status. With additional funding a responsive spare parts inventory could be established which would be applicable to the current ship inventory needs and prevent snowballing cannibalization problems.

2. Design Military-Cargo-Capable Ships. Working with commercial shipbuilders the government could provide specific equipment and design requirements for new ships. The extra cost incurred by shipbuilders could be offset by government subsidies or through attractive tax credits, or combinations of both.

3. Leasing of Government Owned Ships by Commercial Operators. This alternative would guarantee the availability of ships, if needed, in a national emergency. These leased ships would be built to government specifications, which would guarantee war cargo adaptability and would be a viable source of ships to resupply the RRF and NDRF fleets. Some present value analyses have shown that, in the long run, leasing of capital assets by commercial operators can be less expensive than outright purchase arrangements, further supporting the incentive to lease. In addition, if capitalization of leased capital assets becomes a reality this would provide commercial operators an additional tax advantage which would encourage the leasing alternative.

4. Legislative Involvement. Continual research and interest by the Congress and the President to find ways to revitalize the U.S. merchant fleet can only provide positive results affecting the national defense.

5. Financial Incentives. The government could provide financial support to commercial operators and shipbuilders through subsidy and incentive programs, designed as tax credits to stimulate the shipping industry. Directly contributing to the building of a stronger merchant fleet, secondary benefits would also be realized, such as revitalizing the shipbuilding industry and relieving unemployment conditions.

6. Further Study. In conclusion, further studies are always needed for there are always better alternatives and different approaches to the same problem, especially one of this magnitude. Further study focusing on the alternatives is justified if for no other reason than to justify their validity.

Further, in this era of fast moving high technologies, concepts and new innovative approaches affecting the shipping industry will be worth investigating and worth exploration.

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